



Practitioner's Docket No. 1413.03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Israel Morejon et al.  
Application No.: 10/065,635  
Filed: 11/05/2002  
For: Discrete Multitone Modem  
Initialization System and Method

Group No.: Unassigned  
Examiner: Unassigned

Assistant Commissioner for Patents  
Washington, D.C. 20231

PETITION TO MAKE SPECIAL FOR NEW APPLICATION  
MPEP § 708.02, VIII

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1. Petition

Applicant hereby petitions to make this new application, which has not received any examination by the Examiner, special. Applicant requests that the petition to make special be granted under M.P.E.P. section 708.02, V111. The discussion and comments that follow are put forth to satisfy the requirements of MPEP Section 708.02 and thus do not give rise to patent prosecution history estoppel.

2. Claims

All the claims in this case are directed to a single invention. If the Office determines that all the claims presented are not obviously directed to a single invention, then applicant will make an election without traverse as a prerequisite to the grant of special status.

3. Search

The following areas were searched:

Class 370, subclass 350;

Class 375, subclass 13, 14, 222, 231, 295, 354, 357, 364, 365, 377.

11/20/2002 EHAILE1 00000072 10065635

01 FC:1460

130.00 OP



Petition to Make Special  
In re: **Morejon et al.**

Ser. No. **10/065,635**  
Filing Date: **11/05/2002**

Examiner: **Unassigned**  
Group Art: **Unassigned**

**Patent References:**

<u>Inventor</u>	<u>Patent Number</u>	<u>Year</u>
Aslanis et al.	5,627,863	1997
Schmidt	6,002,729	1999
Wu	6,002,722	1999
Ho et al.	6,137,848	2000
Wu	6,219,378	2001
Lakkis et al.	6,359,878	2002
Helard et al.	6,459,744	2002

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**Non-patent literature included:**

“Adaptive Equalization for 100Mbps OWSS Wireless LANs”, J.H. Dholakia, V.K. Jain and B.A. Myers.

“Technologies for 3G Wireless Communications”, J.H. Dholakia and V.K. Jain.

“Synthesis of Band-Limited Orthogonal Signals for Multichannel Data Transmission”, Robert W. Chang.

“Data Transmission by Frequency-Division Multiplexing Using the Discrete Fourier Transform”, S.B. Weinstein and Paul M. Ebert.

“Frequency Domain Data Transmission using Reduced Computational Complexity Algorithms”, Abraham Peled and Antonio Ruiz.

“Multicarrier modulation with low PAR application to DSL and wireless”, Kluwer Academic Publishers.

“Synchronization with DMT Modulation”, Thierry Pollet and Miquel Peeters.

“ML Estimation of Time and Frequency Offset in OFDM Systems”, Jan-Jaap van de Beek, Mangus Sandell and Per Ola Borjesson.

“OFDM for wireless multimedia communications”, pp. 73-90, Artech Publishers.

- "A New Joint Algorithm of Symbol Timing Recovery and Sampling Clock Adjustment for OFDM Systems", Don Kyu Kim et al.
- "A New Fast Symbol Timing Recovery Algorithm for OFDM Systems", Yong-Jung Kim et al.
- "Zipper VDSL: A Solution for Robust Duplex Communication over Telephone Lines", Denis J.G. Mestdagh, Mikael R. Isaksson, and Per Odling.
- "Pilot Tone Selection for Channel Estimation in a Mobile OFDM System", Rohit Negi and John Cioffi.
- "Transmission Techniques for Digital Terrestrial TV Broadcasting", Hikmet Sari, Georges Karam, and Isabelle Jeanclaude.
- "Theory and Application of Digital Signal Processing", Prentice-Hall, Inc. 1975.
- "An Efficient Power-Reduction Technique on DSL Modems", Henry K. Kwok and Douglas L. Jones.
- "Density-functional calculation of the electronic structure and equilibrium geometry of iron pyrite (FeS<sub>2</sub>)", Y. Zeng and N.A. W. Holzwarth.
- "Efficient Modulation for Band-Limited Channels", G. David Forney, Jr. et al.
- "Joint Symbol Timing and Channel Estimation for OFDM Based WLANs", Erik G. Larsson et al.
- "Multicarrier Modulation for Data Transmission: An Idea Whose Time Has Come", John A.C. Bingham.

#### **4. Copy of references**

There is submitted herewith a copy of the references deemed most closely related to the subject matter encompassed by the claims.

Also attached is Form PTO-1449. (PTO/SB/08A and 08B)

## **5. Detailed discussion of the references**

There is submitted herewith a detailed discussion of the references, which discussion particularly points out how the claimed subject matter is distinguishable over the references.

Also attached is a copy of the Information Disclosure Statement previously filed with the application. Copies of references already filed and of record are not included herewith. MPEP §708.02(VIII)(D).

Applicant claims an improved initialization method for modem communication wherein the timing offset required for synchronization is estimated utilizing an entire received DMT frame and the channel impulse response is estimated utilizing the pilot tones received within the same DMT frames utilized for synchronization. The following discussion of the references points out with the particularity required by 37 CFR §1.111(b) and (c), how the claimed subject matter is patentable over the references.

U.S. Patent No. 5,627,863 to Aslanis et al. and assigned to Amati Communication Corporation, describes a discrete multitone modulation transmission in which frame synchronization is monitored and maintained through correlation with a stored frame at the receiver. Aslanis describes a method of correlating complex amplitudes of a synchronizing frame with stored information and thereby determining whether or not the result of the correlation falls below a threshold value. Appropriate adjustments to the frame boundary are then accomplished with the results. The method described by Aslanis requires that known data be transmitted within the synchronizing frame. By contrast, the present invention claims a non-data aided method utilizing an entire frame to determine timing offset required for synchronization. As such, Aslanis does not anticipate, suggest or teach the improved initialization method of the present invention.

U.S. Patent No. 6,002,729 to Schmidt and assigned to Rohde & Schwarz GmbH & Co. KG, describes a non-data aided method for frame synchronization. However, Schmidt does not

describe a non-data aided method utilizing an entire DMT frame to determine the timing offset and pilot tones within the DMT frame to determine the channel impulse response as claimed by the present invention. As such, the patent to Schmidt does not teach or anticipate the present invention.

Patent No. 6,137,848 to Ho and assigned to AT&T Corp., describes a method and system for joint timing recovery and channel estimation for DMT modems. The patent to Ho teaches joint timing acquisition and channel estimation being achieved by the maximum-sum summation window identifying the data frame boundary and by the received impulse samples within the same summation windows approximating the channel impulse response. The method taught by does not utilize a complete DMT frame to determine timing offset information and pilot tones within the received DMT frame to determine the channel impulse response. As such, the patent to Ho does not teach or anticipate the present invention.

The prior art reference, "ML Estimation of Time and Frequency Offset in OFDM Systems", by Jan-Jaap van de Beek et al., describes a joint maximum likelihood estimator of time and frequency offset in OFDM systems. The method described utilizes the redundant information contained within the cyclic prefix. However, Beek does not describe the use of the entire frame for maximum likelihood estimation and does not teach or described the use of pilot tones within the frames to determine the channel impulse response. Therefore, the article by Beek does not teach or anticipate the present invention.

The prior art reference, "Joint Symbol Timing and Channel Estimation for OFDM Based WLANs", by Erik G. Larsson et al., describes an iterative approach utilizing a data-aided maximum likelihood algorithm with two identical OFDM symbols. Larsson does not describe the use of a non-data aided method for timing estimation and the use of pilot tones for channel estimation as claimed by the present invention. As such, the reference to Larsson does not teach or anticipate the present invention.

Applicant believes the remaining references to be immaterial to the patentability of Applicant's invention. However, a brief discussion of each reference is provided to illustrate the

field of search. U.S. Patent No. 6,002,722 to Wu describes a multimode digital modem with specific emphasis on the determination of appropriate filter coefficients. U.S. Patent No. 6,219,378 to Wu describes a general initialization process for modem communication, but is not specific as to timing estimates and channel impulse response requirements. U.S. Patent No. 6,359,878 to Lakkis et al., describes a non-data-aided maximum likelihood method utilizing an algorithm that calculates the timing offset by evaluating the spectral component at the symbol clock frequency. U.S. Patent No. 6,459,744 to Helard describes a method for the time synchronization of a multi-carrier signal receiver utilizing reference carrier frequencies. "Adaptive Equalization for 100 Mbps OWSS Wireless LANs" focuses on the development of adaptive equalization. "Technologies for 3G Wireless Communications" discusses and compares three prominent contenders for 3G wireless communication. "Synthesis of Band-Limited Orthogonal Signals for Multichannel Data Transmission" presents background theory for band-limited orthogonal signals. "Data Transmission by Frequency-Division Multiplexing Using the Discrete Fourier Transform" presents a differential phase modulation scheme that obviates any equalization. "Frequency Domain Data Transmission using Reduced Computational Complexity Algorithms" describes a frequency domain data transmission method that maximizes the usage of the channel. "Multicarrier Modulation with low PAR Application to DSL" describes the channel partitioning method common in DMT systems. "Synchronization for DMT Modulation" presents an overview of timing estimation and correction circuits based on data-aided and non-data-aided algorithms derived from maximum likelihood theory. "OFDM for Wireless Multimedia Communications" provides background information for OFDM operation. "A New Joint Algorithm of Symbol Timing Recovery and Sampling Clock Adjustment for OFDM Systems" introduces a new joint algorithm between symbol timing recovery and sampling clock adjustment using the difference of phase change between the pilot carriers. "A New Fast Symbol Timing Recovery Algorithm for OFDM Systems" proposes a new symbol timing recovery algorithm for OFDM to achieve a fast start-up using the scattered pilots under the frequency offset, the common phase error, and severe noise. "Zipper VDSL: A Solution for Robust Duplex

Communication over Telephone Lines” provides an overview of a digital duplex scheme referred to as Zipper. “Pilot Tone Selection for Channel Estimation in a Mobile OFDM System” addresses the importance of selecting pilot tones for channel estimation. “Transmission Techniques for Digital Terrestrial TV Broadcasting” discusses the potential of OFDM signaling and its limitations. “Linear Convolution of Finite Duration Sequences” provide the theory behind linear convolution. “An Efficient Power-Reduction Technique on DSL Modems” proposes a method based on a hyper-spherical boundary to shape ordinary DMT constellations. “Density-functional calculation of the electronic structure of equilibrium geometry of iron pyrite” is a study of density-functional theory. “Efficient Modulation for Band-Limited Channels” is a tutorial survey of the development of efficient modulation techniques for band-limited channels. “Multicarrier Modulation for Data Transmission: An Idea Whose Time Has Come” provides background information on the theory of multicarrier modulation.

Section 102 of the United States Patent Laws provides in relevant part:

A person shall be entitled to a patent unless . . . the invention was known or used by others in this country, or patented or described in a written publication in this or a foreign country . . .

None of the references obtained in the prior art search disclose or describe Applicant’s invention.

Section 103 of the United States Patent Laws provides in relevant part:

A patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Petition to Make Special  
In re: **Morejon et al.**

Ser. No. **10/065,635**  
Filing Date: **11/05/2002**

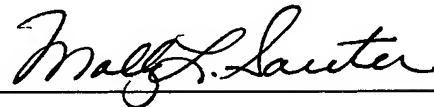
Examiner: **Unassigned**  
Group Art: **Unassigned**

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No combination of references obtained in the prior art search teach or suggest Applicant's invention.

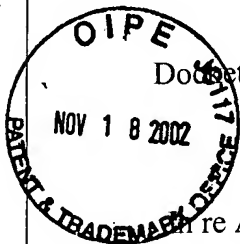
**6. Fee**

The fee required by 37 C.F.R. 1.17(i) is to be paid by the attached check for \$130.00



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375/222  
PATENTS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re Application of:

ISRAEL MOREJON ET AL.

Serial No.: 10/065,635

Filed: 11/05/2002

For: Discrete Multitone Modem Initialization  
System and Method

Art Unit: Unassigned

Director: Unassigned

Asst. Commissioner for Patents  
Washington, D.C. 20231

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TRANSMITTAL OF PETITION TO MAKE SPECIAL

1. Transmitted herewith is a Petition to Make Special for this application.

**FEE DEFICIENCY**

2. If any additional extension and/or fee is required, charge Deposit Account No. 500745.

Signature of Practitioner

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**CERTIFICATE OF MAILING**

(37 C.F.R. § 1.8)

I HEREBY CERTIFY that this correspondence is being deposited with the United States Postal Service by First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on November 15, 2002.

Deborah Preza